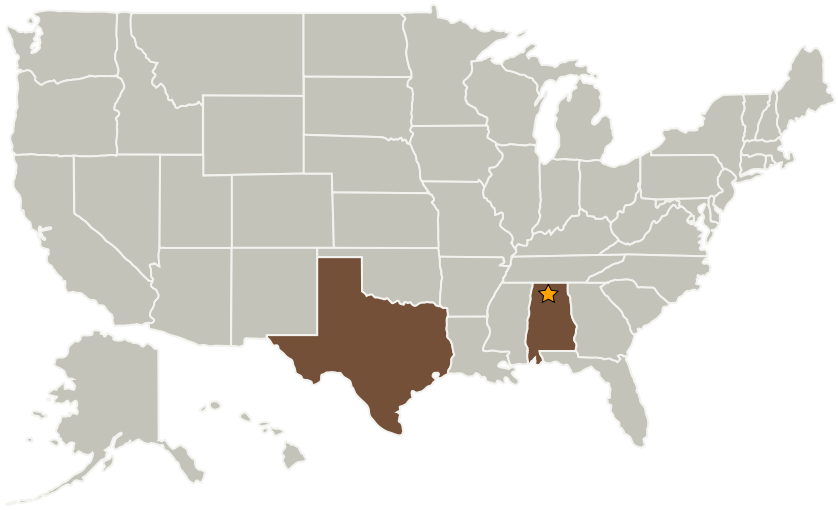
Electrochemical-Driven Fluid Pump for Spacecraft Thermal Control, Phase II

Completed Technology Project (2007 - 2011)

Project Introduction

With the increasing power demands and longer life spans of space vehicles, their thermal management becomes ever more critical. Accompanying this is an unprecedented need for reduction in spacecraft size and weight. However, reduced weight leads to higher power densities, and waste-heat dissipation densities have grown by an order of magnitude with the use of smaller, more powerful electronics. Active thermal control methods are needed to cope with the increasing heat dissipation requirements and environmental extremes. In recent years, spacecraft have employed mechanically pumped fluid loops to efficiently transfer large amounts of thermal energy between two points by means of a forced liquid convention loop. The development of long-life fluid pumps, however, has not kept pace with the demands of advanced thermal control systems. Conventional electric motor-driven fluid pumps are heavy, bulky, inefficient, and prone to wear. In Phase I, the operation and storage of Lynntech fluid pump over a range of environmental extremes was demonstrated. In Phase II, Lynntech will develop a fluid pump significantly smaller, lighter, and more efficient than conventional pumps currently used in NASA spacecraft.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Lynntech, Inc.	Supporting Organization	Industry	College Station, Texas

Primary U.S. Work Locations	
Alabama	Texas

Project Transitions

November 2007: Project Start

November 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.1 In-space Propellant Storage & Utilization